

WE CLAIM:

1. A process for producing a dried carboxylic acid cake, said process comprising:
 - (a) removing in a liquor exchange zone impurities from a
5 carboxylic acid slurry to form a water-wet carboxylic acid cake, a mother liquor stream, a solvent mother liquor stream, and a solvent/water byproduct liquor stream; wherein solvent or water is added counter current to the flow of said carboxylic acid slurry;
 - (b) drying said water-wet carboxylic acid cake or carboxylic acid
10 cake with solvent in a drying zone to form said dried carboxylic acid cake.
2. The process according to claim 1 wherein said liquor exchange zone comprises from about 2 to about 4 stages of water or solvent counter current washes.
3. The process according to claim 1 wherein said solvent and said
15 water is added counter current to the flow of said carboxylic acid slurry.
4. A process according to claim 1 wherein said carboxylic acid is selected from a group consisting of terephthalic acid, isophthalic acid, naphthalene dicarboxylic acid, trimellitic acid, and mixtures thereof.
5. A process according to claim 1 wherein said carboxylic acid is
20 terephthalic acid.
6. A process according to claim 1, 2 or 3 wherein said drying zone evaporates at least 10% of volatiles in said water-wet carboxylic acid cake.

7. A process according to claim 1 wherein said crude carboxylic acid slurry comprising terephthalic acid, catalyst, acetic acid, and impurities is withdrawn at a temperature between about 110°C to about 200°C from an oxidation zone.
- 5 8. A process for producing a dried carboxylic acid cake, said process comprising:
- (a) removing in a solvent liquor exchange zone impurities from a carboxylic acid slurry to form a carboxylic acid cake with solvent, a mother liquor stream, and a solvent mother liquor stream;
 - 10 (b) optionally, adding water in a counter current water wash zone to said carboxylic cake with solvent to produce a water-wet carboxylic acid cake and a solvent/water by product liquor stream;
 - (c) drying said water-wet carboxylic acid cake or said carboxylic acid cake with solvent in a drying zone to form said dried carboxylic acid
15 cake.
9. A process according to claim 8 wherein said carboxylic acid is selected from a group consisting of terephthalic acid, isophthalic acid, naphthalene dicarboxylic acid, trimellitic acid, and mixtures thereof.
10. A process according to claim 8 wherein said carboxylic acid is
20 terephthalic acid.
11. A process according to claim 8 or 9 wherein said drying zone evaporates at least 10% of volatiles in said water-wet carboxylic acid cake.

12. A process according to claim 8 wherein said crude carboxylic acid slurry comprising terephthalic acid, catalyst, acetic acid, and impurities is withdrawn at a temperature between about 110°C to about 200°C from an oxidation zone.
- 5 13. A process for producing a dried carboxylic acid cake, said process comprising:
- (a) removing in a solid-liquid separation zone impurities from a carboxylic acid slurry to form a slurry or cake product and a mother liquor stream;
 - 10 (b) removing in a counter current solvent-water liquor exchange zone residual impurities from said slurry or cake product to form a water-wet carboxylic acid cake, a solvent mother liquor stream, and a solvent/water byproduct liquor stream; and
 - (c) drying said water-wet carboxylic acid cake or said carboxylic acid cake with solvent in a drying zone to form said dried carboxylic acid cake.
- 15 14. A process according to claim 13 wherein said carboxylic acid is selected from a group consisting of terephthalic acid, isophthalic acid, naphthalene dicarboxylic acid, trimellitic acid and mixtures thereof.
- 20 15. A process according to claim 13 wherein said carboxylic acid is terephthalic acid.
16. A process according to claim 13 wherein said crude carboxylic acid slurry comprising terephthalic acid, catalyst, acetic acid, and impurities is

withdrawn at a temperature between about 110°C to about 200°C from an oxidation zone.

17. A process according to claim 13 or 14 wherein said drying zone evaporates at least 10% of volatiles in said water-wet carboxylic acid cake.

5 18. A process for producing a dried carboxylic acid cake, said process comprising the following steps:

(a) removing a solvent from a slurry or cake product in a counter current solvent-water liquor exchange zone; wherein a substantial portion of the solvent in said slurry or cake product is replaced with water to form a
10 water-wet carboxylic acid cake;

(b) drying said water-wet carboxylic acid cake or said carboxylic acid cake with solvent in a drying zone to form said dried carboxylic acid cake.

19. A process according to claim 18 wherein said carboxylic acid is
15 selected from a group consisting of terephthalic acid, isophthalic acid, naphthalene dicarboxylic acid, trimellitic and mixtures thereof.

20. A process according to claim 18 wherein said carboxylic acid is terephthalic acid.

21. A process according to claim 19 wherein said crude carboxylic acid
20 slurry comprising terephthalic acid, catalyst, acetic acid, and impurities is withdrawn at a temperature between about 110°C to about 200°C from an oxidation zone.

22. A process according to claim 18 or 19 wherein said drying zone evaporates at least 10% of volatiles in said water-wet carboxylic acid cake.

23. A process for producing a dried terephthalic acid cake, said process comprising the following steps:

5 (a) removing in a counter current solvent wash zone residual impurities from a slurry or cake terephthalic acid product to form a terephthalic acid cake with acetic acid;

(b) optionally, removing a substantial portion of a solvent in a counter current water wash zone from said terephthalic acid cake with
10 acetic acid to form a water-wet terephthalic acid cake; and

(c) drying said water-wet carboxylic acid cake or said carboxylic acid cake with solvent in a drying zone to form said dried carboxylic acid cake.

24. A process according to claim 23 wherein said counter current solvent
15 wash zone comprises a solid-liquid separation device that is operated at a temperature between about 40 °C to about 155 °C.

25. A process according to claim 24 wherein said carboxylic acid is terephthalic acid.

26. A process according to claim 23, 24 or 25 wherein said drying zone
20 evaporates at least 10% of volatiles in said water-wet carboxylic acid cake.

27. A process according to claim 22 wherein said crude carboxylic acid slurry comprising terephthalic acid, catalyst, acetic acid, and impurities is

withdrawn at a temperature between about 110°C and about 200°C from an oxidation zone.

28. A process for producing a dried terephthalic acid cake, said process comprising:

- 5 (a) removing a solvent from a slurry or cake terephthalic acid product in a counter current solvent-water liquor exchange zone; wherein a substantial portion of the solvent in said slurry or cake terephthalic acid product is replaced with water to form a water-wet terephthalic acid cake;
- (b) drying said water-wet terephthalic acid cake or said
- 10 terephthalic acid cake with solvent in a drying zone to form said dried terephthalic acid cake.

29. A process according to claim 28 wherein said solvent liquor exchange zone comprises a solid-liquid separation device that is operated at a temperature between about 40 °C to about 155 °C.

15 30. A process according to claim 28 wherein said drying zone evaporates at least 10% of volatiles in said water-wet carboxylic acid cake.

31. A process according to claim 29 wherein said drying zone evaporates at least 10% of volatiles in said water-wet carboxylic acid cake.

32. A process according to claim 29 wherein said crude carboxylic acid

20 slurry comprising terephthalic acid, catalyst, acetic acid, and impurities is withdrawn at a temperature between about 110°C and about 200°C from an oxidation zone.

33. A process for producing a dried terephthalic acid cake, said process comprising:

- (a) removing in a counter current solvent wash zone residual impurities from a slurry or cake terephthalic acid product from a terephthalic acid cake with acetic acid; wherein said counter current wash zone comprises at least one solid-liquid separation device that is operated at a temperature between about 40 °C to about 155 °C ;
- (b) optionally, removing a substantial portion of a solvent in a counter current water wash zone from said terephthalic acid cake with acetic acid to form a water-wet terephthalic acid cake; wherein said counter current water wash zone comprises at least one solid-liquid separation device that is operated at a temperature between about 40 °C to about 155 °C;
- (c) drying said water-wet terephthalic acid cake or said terephthalic acid cake with solvent in a drying zone to form said dried terephthalic acid cake.

34. A process for producing a dried carboxylic acid cake, said process comprising:

- (a) removing in a solid-liquid separation zone impurities from a carboxylic acid slurry to form a slurry or cake product and a mother liquor stream;

(b) adding solvent to a slurry or cake product in a counter current solvent wash zone to said slurry or cake product to produce a carboxylic acid cake with solvent and a solvent mother liquor stream;

(c) optionally, adding water in a counter current water wash zone
5 to said carboxylic cake with solvent to produce a water-wet carboxylic acid cake and a solvent/water by product liquor stream;

(d) drying said water-wet carboxylic acid cake or said carboxylic acid cake with solvent in a drying zone to form said dried carboxylic acid cake.

10 35. A process according to claim 34 wherein said carboxylic acid is selected from a group consisting of terephthalic acid, isophthalic acid, naphthalene dicarboxylic acid, trimellitic acid and mixtures thereof.

36. A process according to claim 34 wherein said carboxylic acid is terephthalic acid.

15 37. A process according to claim 34 or 35 wherein said drying zone evaporates at least 10% of volatiles in said water-wet carboxylic acid cake.

38. A process according to claim 34 wherein said crude carboxylic acid slurry comprising terephthalic acid, catalyst, acetic acid, and impurities is withdrawn at a temperature between about 110°C and about 200°C from an
20 oxidation zone.

39. A process for producing a dried terephthalic acid cake, said process comprising:

(a) removing in a solid-liquid separation zone impurities from a terephthalic acid slurry to form a slurry or cake terephthalic acid product and a mother liquor stream;

(b) adding solvent in a counter current solvent wash zone to said
5 slurry or cake terephthalic acid product to produce a terephthalic acid cake with solvent and a solvent mother liquor stream;

(c) optionally, adding water in a counter current water wash zone to said terephthalic acid cake with solvent to produce a water-wet terephthalic acid cake and a solvent/water by product liquor stream;

10 (d) drying said water-wet terephthalic acid cake or said terephthalic acid cake with solvent in a drying zone to form said dried carboxylic acid cake.

40. A process according to claim 39 wherein said counter current solvent wash zone comprises a solid-liquid separation device that is operated at a
15 temperature between about 40 °C to about 155 °C.

41. A process according to claim 40 wherein said counter current water wash zone comprises a solid-liquid separation device that is operated at a temperature between about 40 °C to about 155 °C.

42. A process according to claim 39 wherein said carboxylic acid is
20 terephthalic acid.

43. A process according to claim 39 or 40 wherein said drying zone evaporates at least 10% of volatiles in said water-wet carboxylic acid cake.

44. A process according to claim 39 wherein said crude carboxylic acid slurry comprising terephthalic acid, catalyst, acetic acid, and impurities is withdrawn at a temperature between about 110°C and about 200°C from an oxidation zone.

5 45 A process according to claim 39 wherein said counter current water wash zone comprises from about 2 to about 4 stages of water counter current washes.

46. A process according to claim 39 wherein said counter current solvent wash zone comprises from about 2 to about 4 stages of solvent counter
10 current washes.

47. A process according to claim 45 wherein said counter current solvent wash zone comprises from about 2 to about 4 stages of solvent counter current washes.